REMARKS

The Applicant thanks the Examiner for granting the Applicant's request for a telephonic interview. By this amendment, claim 12 has been canceled without prejudice or disclaimer. Claim 13 has been amended. Support for the amendment is found in the specification. No new matter has been added. Claims 13 and 15 are presently pending in this application. Reconsideration of this application for allowance of all pending claims are hereby respectfully requested in view of the amendments to the claims and the following remarks.

Rejection under 35 U.S.C. § 103

In the Office Action, claims 12, 13 and 15 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Cheung et al. (U.S. Patent No. 6,178,205) in view of Hossack et al. (U.S. Patent No. 6,083,168). Claim 12 has been canceled by this Amendment. Rejection of claim 12 is presently moot. The Applicant respectfully traverses the rejection of claim 13 and 15.

With regard to claim 15, the Examiner is directed to Fig. 7 of the present disclosure, which shows that the pixel-by-pixel differences computed by the image difference calculating section 111 are simultaneously forwarded to or shared by two other sections. As recited in claim 15 and supported by Fig. 7, one of the two sections is the motion detecting section 112 and the other is the random noise reducing section 521. The Applicant respectfully submits that the cited prior references, either alone or in combination, do not have the feature of two sections sharing the computed pixel-by-pixel differences computed by the image difference calculation section 111, as recited in claim 15. First of all, as the Examiner correctly pointed out, Cheung does not disclose motion estimation using a sum of absolute differences. Second, Cheung also does not suggest motion estimation using absolute differences. Third, even if Cheung and Hossack et al. are combined, the combination does not remedy the deficiency because the combination fails to

teach or disclose that pixel-by-pixel absolute differences are shared by a motion estimation section and a random noise reducing section, as recited in claim 15.

Hossack et al. describe two different alternative implementations to estimate "d", a measure related to image movement. Hossack et al. states, "the function d can be computed by using motion estimates of a sub-block of moving pixels or by computing the difference between pixels at the same spatial location of successive frames." The first implementation discussed for obtaining "d" is via motion estimates computed using a conventional motion estimation approach, as described in detail at column 10, lines 52-67. Under a conventional motion estimation approach, a motion vector is represented by "the value (x,y) which gives the minimum sum of absolute differences ... , where x and y are the pixel shifts required to obtain the best match" (column 10, lines 56-61). Using such a conventional approach, a motion vector is obtained by matching a first block of pixels in one image with each block within a search area in another image until a best matching block is found that yields a minimum absolute difference. The location shifts (x,y) between the first block in one image and the best matching block in another image represents a motion estimate.

The second alternative implementation disclosed by Hossack et al. is discussed at column 11, lines 1-45. As Hossack et al. indicated, "the function d can also be computed by computing the difference between pixels at the same spatial location in successive frames – an indication of image movement." Clearly, this is an alternative to the conventional motion estimation. Although conventionally a search is required to find a best match, this alternative does not perform a search or matching. Instead, it computes only pixel-by-pixel differences of corresponding pixel locations (i.e., no shifting) and uses such pixel-by-pixel differences as an

indication of motion. That is, direct pixel-to-pixel differences without matching, according to Hossack et al., is used as estimation of motion. Hossack et al. further discussed several ways to compute such pixel-by-pixel differences. For example, a sum of pixel-by-pixel differences of one block can be computed based on a full sampled scheme (column 11, lines 4-20), a sub-sampled scheme (column 11, lines 21-30), or based on an averaged sum of differences averaged over a multiple blocks within the same image frame (column 11, lines 31-45).

It is evident that Hossack et al. disclose these two alternative implementations both as different approaches to estimate "d", a measure related to motion. More importantly, the pixel-by-pixel differences, as described in Hossack et al., are not used for random noise reduction. In addition, there is no teaching or disclosure that a common component can be introduced that computes pixel-by-pixel differences, which can then be shared by both a motion estimation section and a random noise reduction section, as recited in claim 15. So, even if Cheung and Hossack et al. are combined, the combination still does not have the feature recited in claim 15. Hence, the combination of Cheung and Hossack et al. fails to remedy the deficiency mentioned above. Therefore, claim 15 is not obvious over Cheung in view of Hossack et al. The Applicant respectfully submits that claim 15 is patentable and requests that rejection of claim 15 under 35 U.S.C. §103(a) be withdrawn.

Claim 13 depends from claim 15. The Applicants respectfully submits that claim 13 is patentable for at least the same reasons stated above with respect to claim 15 and for additional features recited therein. Therefore, the Applicant respectfully requests that rejection of claim 13 under 35 U.S.C. §103(a) be withdrawn.

CONCLUSION

Accordingly, it is believed that all pending claims are now in condition for allowance. Applicant therefore respectfully requests an early and favorable reconsideration and allowance of this application. If there are any outstanding issues which might be resolved by an interview or an Examiner's amendment, the Examiner is invited to call Applicant's representative at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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